

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**  
**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In Re Patent Application of:	:	Appeal From:
Pierattilio Di GREGORIO	:	
	:	
Conf. No.: 2819	:	Group Art Unit: 1791
	:	
Appln. No.: 10/811,604	:	Examiner: Patrick Butler
	:	
Filing Date: March 29, 2004	:	Attorney Docket No.: 6023-175US(BX2592M)
	:	

Title: METHOD FOR PRODUCING THERMO-INSULATING CYLINDRICAL VACUUM PANELS AND PANELS THEREBY OBTAINED

**ON APPEAL FROM THE PRIMARY EXAMINER TO THE BOARD OF**  
**PATENT APPEALS AND INTERFERENCES**

**APPELLANT'S REPLY BRIEF UNDER 37 C.F.R. § 41.39**

This is in reply to the Substitute Examiner's Answer dated January 18, 2008 (Paper No. 20080103), which replaced the Examiner's Answer dated December 12, 2007 and started a new time for response). This Reply Brief is being timely filed within two months by March 18, 2008.

Further to Appellant's Appeal Brief filed September 14, 2007, Appellant hereby replies to certain arguments of the Examiner in the Examiner's Answer dated January 18, 2008. The positions taken by the Examiner in the Examiner's Answer, which are not specifically addressed in this Reply Brief, are believed to be adequately addressed in Appellant's Appeal Brief.

**I. Benson Does Not Disclose a Vacuum Panel Having a Sealed Envelope Containing a Filling Material Selected From Inorganic Powders and Porous Organic Foams**

At page 3, Section 9A, second paragraph, of the Examiner's Answer, the Examiner states that

“Benson et al disclose a known procedure for producing a planar thermo-insulating vacuum panel... comprising an envelope...containing at least one filler selected from the group consisting of inorganic powders...and porous organic foams....”

In the very next paragraph the Examiner acknowledges that

“Benson et al...do not expressly disclose that the powders and foams are included inside the vacuum envelope.”

These inconsistent contentions of the Examiner are not understood. Is the Examiner arguing in the alternative?

In any event, the record should be perfectly clear that Benson does not teach vacuum panels containing a filler selected from inorganic powders and porous organic foams. The portion of Benson relied upon by the Examiner (col. 16, lines 15-29, i.e., claims 3 and 4) makes this clear. Thus, the claims of Benson are directed to a composite thermal insulation (illustrated in Fig. 15 and described at col. 8, lines 50-68) in which a plurality of small, evacuated insulation panels are stacked or laminated together in a composite panel 80 by embedding them in a more conventional insulation material 82 which is different from the thermal insulation of the evacuated insulation panels. That is, the different insulation material is a foam insulation or powder insulation material, which is the conventional insulation material 82 in which the smaller vacuum panels are embedded.

In other words, the foam or powder insulation is expressly disclosed by Benson to be outside the vacuum envelope (small vacuum panels).

## **II. Benson Excludes Filler Materials in the Form of Powders, Thus Making Impossible the Examiner's Proposed Combination With Hunter**

In the paragraph bridging pages 3 and 4 of the Examiner's Answer, the Examiner attempts to cure the deficiency of Benson by arguing that it would have been obvious to a person of ordinary skill in the art to include a powder or foam, as taught by Hunter, in the panel taught by Benson. This argument is based upon an incorrect reading of Hunter and ignores the teachings of Benson.

First, the Examiner's incorrectly states that

“Hunter teaches a bendable vacuum panel (evacuating the panel) (col. 8, lines 57-67), which contains at least one filler selected from the group consisting of inorganic powders and porous organic foams (col. 9, lines 21-29).”

The Examiner's citation of col. 8, lines 57-67 is at the end of Hunter's description of his first embodiment (“Hunter Embodiment I”), which is shown in Figs. 1-8, for example, and comprises alternating stacked thermal insulation elements 12 and 14, formed from a thin sheet material. (See Section VII C.2., pages 4-5 of Appeal Brief). While this barrier insulation of Hunter Embodiment I may be used to insulate a curved surface, according to Hunter, it is not disclosed to contain a filler selected from inorganic powders and porous organic foams. On the other hand, the Examiner's citation of col. 9, lines 21-29 is at the beginning of the description of Hunter Embodiment II, shown for example in Figs. 10 and 11. While this embodiment is disclosed as having elements 18 and 19 made of compacted powders or organic foams, such elements are solid and not disclosed to be bendable or curvable, nor are they “a filler.”

Second, even if Hunter disclosed a filler consisting of inorganic powders and porous organic foams, the use of such fillers is specifically excluded by the teachings of Benson. Thus, Benson made clear that it is impossible to use fine glass fibers and perlite (inorganic powders) particles in vacuum panels, due to the problem of causing leaks in

the welds of the metal envelope (col. 2, lines 66-col. 3, line 10). Moreover, as pointed out in paragraph 11 of the Manini Declaration (see Evidence Appendix), this teaching of Benson would also exclude porous organic foams, which have the tendency to generate powders.

Third, the heart of Benson's invention consists in manufacturing panels with two opposite sheets made of metal and spaced apart, not by a filler material, but by discreet spacers, for example a plurality of spherical glass or ceramic beads (col. 4, lines 10-17). These spacers provide mechanical support while minimizing thermal conductance and maintaining a substantially point contact between each spherical glass bead spacer 16 and the metal wall sheets 12, 14. To fill the Benson panels with a filler consisting of inorganic powders or organic foams, as presently claimed, would violate Benson's concept of minimizing thermal conductance by providing point contact for the spacers.

Accordingly, the Examiner's proposed combination of the teachings of Hunter and Benson violates the teachings of each of the references as a whole and results in an impossible combination with the defects pointed out by Benson and the Manini Declaration.

### **III. The Spherical Beads of Benson are in No Way Comparable to the Claimed Inorganic Powder Filling Material**

In Section 10 of the Examiner's Answer (Response to Argument), the Examiner argues at the bottom of page 8 that the glass or ceramic beads disclosed as being in Benson's envelopes could be the "inorganic powder" filling material required by claim 1. This argument borders on the absurd. There is no evidence of record and no logic to indicate that anyone skilled in the art would consider the discreet spacer beads of Benson to be a powder filling material. Powders are, by definition, fine particles or dust resulting from grinding, pounding, etc.

The Figs. of Benson clearly show that they do not touch each other (as would the particles of a powder), and further that they do not fill the panel. Moreover, the Examiner's argument ignores the manufacturing process described at col. 7, lines 9-40 of

Benson, which requires the formations of pockets on the inner surfaces of the sheets of the panel and the coating of the particles with adhesive. This would result in filling the panel with a mixture of adhesive and powder without evacuable spaces between powder particles, and ultimately a panel with very poor thermal insulation.

**IV. Benson Only Discloses That the Panel Can Be Bent or Formed Around a Curve, Not Calendering or Any Other Method**

At page 10 of the Examiner's Answer, the Examiner states that

“Benson's teaching of bending vacuum panels in curves (see col. 6, lines 48-54)...is inclusive of calendering.”

Appellant strenuously objects to this characterization of Benson's teachings. There is no teaching or suggestion in Benson of calendering or any other method of forming around curves. The portion of Benson cited by the Examiner does not actually even teach “bending vacuum panels in curves,” but rather that the metal wall sheets 12, 14 are bendable so that the panel can be formed in curves.

In fact, a panel may be bent in many different ways, for example by causing it to rest on a curved surface to be insulated and bending it manually against that surface. The fact that Benson might teach bending or curving, in general, in no way teaches calendering or any other specific method.

**V. Benson Uses Adhesive Only Inside the Vacuum Panel, Not on Its Face (Outside)**

With respect to claim 8, the Examiner argues at Section 9C of the Examiner's Answer (see bottom of page 7) that Benson teaches spacer beads coated with polystyrene or similar adhesive to be affixed to the wall sheets of the planer vacuum panel, thus necessarily creating at least a layer of polymeric adhesive on at least one face of the panel. The Examiner further argues that Haase discloses that polystyrene can be foamed. This argument not only ignores the plain meaning of present claim 8, but also the teachings of the prior art as a whole.

The layer of adhesive polymeric foam provided in claim 8 is placed on at least one face of the panel. A face of the panel (as opposed to a face of one of the barrier sheets) is clearly on the outside of the panel. In contrast, the adhesive used in Benson is on the inside of the panel to hold the spacers in place. Moreover, even if there could be such a thing as an “inside face” of a panel, no such face exists in the presently claimed panels, since the panels are filled with a filling material which obscures any possible inner “face.”

Moreover, the Examiner’s contention regarding Haase ignores the complicated manufacturing process described at col. 7, lines 9-40 of Benson, in which the assembly of the beads with adhesive and wall sheets is heated to a sufficient temperature to break down the polystyrene into more volatile styrene monomers, which vaporize at such temperatures (col.7, lines 31-34). Such temperatures would clearly destroy the polystyrene foam of Haase. As a result, no foam adhesive would remain on the Examiner’s proposed combination panel, regardless of which “face” the adhesive is placed on.

### **Conclusion**

For all of the above reasons, as well as the reasons set forth in Appellant’s main Appeal Brief, the Examiner’s rejections are clearly improper and should be reversed.

Respectfully submitted,  
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March 17, 2008  
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